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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/262,000 | 03/05/1999 | SIK ON KONG | CS98-076 | 8744 |

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EXAMINER

VOCKRODT, JEFF B

| ART UNIT | PAPER NUMBER |
|----------|--------------|
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2822

DATE MAILED: 11/22/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/262,000

Applicant(s)

KONG ET AL.

Examiner

Jeff Vockrodt

Art Unit

2822

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 September 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 8-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 8-12 is/are rejected.
- 7) ☒ Claim(s) 13-32 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

This office action is in response to the amendment filed on September 20, 2002. Claims 8-32 are pending.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pat. No. 6,027,999 ("Wong") in view of U.S. Pat. No. 6,124,912 ("Moore").

Wong teaches a method of forming a reflective LCD that positions a LCD standoff on a passivation layer that covers the reflective surface comprising the steps of:

providing a silicon wafer 10 having a pattern of active device structures therein and thereon;

forming a first metallic layer 20 over the said silicon oxide 18 (this limitation lacks antecedent basis);

forming a second metallic layer 32 over the said silicon oxide 24, which is used both for connections 32 and for bonding pads 30;

forming a silicon oxide insulation 36 over the said second metal layer 32;

forming a third metallic layer 42 over the surface of said layer of silicon dioxide 36;

forming a photoresist mask (not shown) over the said third metallic layer 42 having a covering over the planned pixel locations 42 of the said liquid-crystal-on-silicon display device;

removing the said third metallic layer not covered by the said photoresist mask (not shown);

removing the said photoresist (not shown) mask to provide that each said pixel retains said metallic layer 42, which shall act as a mirror reflector for the light incident upon said liquid-crystal-on-silicon display device; and

depositing a passivation layer on the pixels 42.

Wong differs from the claimed invention by not teaching depositing optical interference layers of silicon oxide/silicon nitride/silicon oxide/silicon nitride over said third metallic layer 42 and said silicon dioxide layer 36.

Moore teaches an improvement on reflective LCDs that have a passivation layer above a reflective pixel layer wherein the passivation layer is replaced with a layer of silicon oxide 233 /silicon nitride 232 /silicon oxide 231 /silicon nitride 230 over the reflector and the oxide layer that underlies the reflector. This quarter wave stack having four dielectric layers creates constructive interference which increases the reflectance of the pixel. Moore, col. 3, ll. 32-42.

It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the passivation layer of Wong with the quarter wave stack of Moore to increase the reflectance of the pixel as taught by Moore.

Claims 9-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wong and Moore as applied to claim 8 above, further in view of U.S. Pat. No. 5,831,710 ("Colgan").

Wong and Moore do not teach the method of forming the oxide post using silicon oxide by wet etching.

Colgan teaches a method of forming alignment post on a LCD device by forming an oxide 44 on a thin etch stop layer 43 and performing a pattern etch back of the oxide to form oxide posts 24 using a wet etchant. Colgan teaches that the thickness of the oxide 44 can set

Art Unit: 2822

the gap between the cover and the electrodes. Colgan, col. 2, ll. 35-50. The gap is set to approximately 2.5 microns. Colgan, col. 6, ll. 1-2.

It would have been obvious to one of ordinary skill in the art at the time of the invention to form an alignment post by deposition of oxide and a patterned etchback above the quarter wave stack of Moore and Wong because it was known that the gap between the reflective layer and the cover can be controlled in this way as taught by Colgan.

Allowable Subject Matter

Claims 13-32 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 13-32 require, in addition to the limitations of claim 8, a combination of material and process for forming alignment posts which are not taught in the references of record. Claims 13-16 additionally requires forming alignment post using amorphous silicon by plasma etching. Claims 17-23 additionally require forming alignment posts using silicon nitride by plug filling. Claims 24-28 additionally require forming alignment posts using insulation material by lift off. Claims 29-32 additionally require forming alignment posts using polyimide by photosensitive etching. Neither Wong, Moore, nor Colgan, taken alone or in combination, teach all of the limitations of any of claims 13-32. For the foregoing reasons, claims 13-32 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

Applicant's arguments filed September 20, 2002 have been fully considered but they are not persuasive.

It appears from Applicant's arguments commencing at page 10 that Applicants are discussing either U.S. Pat. No. 6,051,446 ("Moore et al.") or U.S. Pat. No. 5,982,472 ("Moore"). It is true that these references do not teach an optical interference layer. Applicant is referred to the optical interference layer 235 from Fig. 2 of U.S. Pat. No. 6,124,912 to Moore, the reference relied on by the examiner, that is formed directly over the electrodes. It is noted that applicant has failed to substantively address U.S. Pat. No. 6,124,912 to Moore in the response. The examiner's point is that it would have been obvious to place conventional LCD standoffs (support pillars or alignment posts) on the optical interference layer 235 in Fig. 2 of U.S. Pat. No. 6,124,912 to Moore within the cavity 207 to support the glass plate 201 in a manner consistent with Wong. Wong shows an LCD standoff 54 positioned between an electrode coating layer 44, 46 and a glass plate 56 within a cavity region 52. Doing so will provides a structure that falls within the scope of at least claim 8.

Applicant argues that Wong does not teach "the combined creation of insulating material alignment posts with optical interference layers." Claim 8 does not require the combined creation of insulating material alignment posts with optical interference layers. The only mention of alignment posts in claim 8 is in the preamble wherein the claim states "A method of forming a device structure that combines insulating materials for alignments [sic] posts and optical interference layers associated with an active device structure in a silicon body comprising ...". The claim body goes on to recite a number of distinct steps that do not relate back or anyway imply that the reference to alignment posts in the preamble is anything more than an intended use for the method recited in the body of the claim. Accordingly, the preamble of claim 8 is accorded little weight in distinguishing the claimed invention over the prior art.

Even if the preamble were considered fully limiting for claim 8, all that it would require is a method that somehow combines insulating materials for alignment posts and optical

interference layers. That the optical interference layer comprises an insulating material and is used with an alignment post is enough to meet this nebulous limitation. With this in mind, Wong teaches a LCD standoff (alignment post) overlying protective insulating layers and Moore (U.S. 6,124,912) suggests forming optical interference layers in place of the protective insulating layers of Wong. Although no single reference of record combines optical interference layers and alignment posts (standoffs), Wong and Moore suggest this combination as set forth above.

Applicant analyzes Wong at pages 8-9. The Examiner does not understand applicant's sentence: "A passivation stack is next formed over the metal pixels that rest on the metal alignment post..." Where is there a metal alignment post in Wong? The LCD standoff 54 is what the Examiner considers to be alignment post, not the passivation layers 44, 46 of Wong (Wong, Fig. 7). Compare the alignment posts 14 of Fig. 1 of this application with the LCD standoff 54 in Fig. 7 of Wong. Are the alignment post not for supporting the glass substrate over the liquid crystal cavity? Applicant argues that Colgan does not teach optical interference layers; however, the examiner did not rely on Colgan for a teaching of optical interference layers. Accordingly, the rejections of record are maintained.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

Art Unit: 2822

however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning communications from the examiner should be directed to Jeff Vockrodt at (703) 306-9144 who can be reached on weekdays from 9:30 am to 5:00 pm EST. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian, can be reached at (703) 308-4905.

The fax numbers for this Group are (703) 305-3432, (703) 308-7722, (703) 305-3431, and (703) 308-7724. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist at (703) 308-0956.

November 20, 2002

J. Vockrodt



**AMIR ZARABIAN
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